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Research Article

Contribution Of Social Infrastructure On Human Development: A Cross Section Study Of Indian States

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Abstract: Human development is and should be the primary concern of any government. Though there are various factors contributing towards human development, but social infrastructure plays a pivotal role in it. It is among the most important priorities of any government to make efforts towards the creation of social infrastructure. This study is an attempt to evaluate the contribution of social infrastructure like governance, health and education on the Human Development Index (HDI) of various states of India. A logit model is used and regression analysis is carried out to see the contribution. The result shows that health infrastructure has a positive impact whereas education infrastructure has a negative impact on HDI..

Keywords:

1. Introduction

Welfare of a country is not necessarily judged on the basis of its GDP. Having just an economic indicator does not show the true value of welfare or human development. Various factors other than economic should be taken into consideration. Human Development Index (HDI) may not be the most appropriate but is considered to be an efficient measure of human development or welfare in a country. United Nations Development Program (UNDP) defines human development as the process of enhancing people's choice and capabilities to live a healthy life with basic education and decent standard of living as well as enjoying political freedom and human rights. However, level of human development not only varies across the countries but it also varies within countries due to various factors. Social infrastructure is one of those factors that plays pivotal role in human development. Social infrastructure is nothing but the amalgamation of all the indispensable facilities without which there cannot be any human development. Social infrastructure can be considered as building and maintaining of those facilities or institutions which supports social services. It can include healthcare facilities such as hospitals, nursing homes, etc; educational facilities such as schools, colleges, universities, etc; public facilities such as community housing, prisons and transportation facilities.

2. Literature Review

The formative literatures have valued infrastructure's role as a catalyst for economic development, which can help in the accessibility of resources and enhance the impact of policies (Aschauer 1990, World Bank 1994).

Infrastructure is the summation of resources in terms of instruments that help schooling, medical services, local area improvement, pay dissemination, work and social government assistance. Infrastructure services influence individuals from various perspectives. Individuals utilize such services to warm and light their homes, devour and produce items, and speak with one another. Likewise, the accessibility of infrastructure, like transportation, that are required for the circulation of crude materials to plants and of completed items to business sectors influences business benefit and intensity (Jacoby, 2002).

Increasing reliance on infrastructure can be accounted for its contribution towards economic growth both by expanding profitability and by giving conveniences that upgrade the personal satisfaction (Kessides, 1996). Hence, government should give priority to the development of infrastructure. A thorough procedure for the planning of infrastructure should include proper distribution of finances and increase in the participation of private sectors. Moreover they also argued that the higher authorities and local bodies must come together to design and implement policies regarding development of infrastructure. The existence of proper infrastructural facilities can attract both public and private investment in a region thus bringing economic growth (Kusharjanto and Kim, 2011).

Agenor (2006) in his theory of infrastructure-led development argued that a region can move from a state of low growth equilibrium to a high and steady growth state if the administration takes care of the investment plans in such a way that there is productive spending and minimum unproductive expense. Another study based on South Asia reveals that output can increase significantly if there is growth of infrastructure. This study found that there exist a long-run equilibrium relationship between infrastructure and output along with human capital, labor force, international trade and gross domestic capital formation (Sahoo & Dash, 2012).

Economic and social infrastructure acts as a base for growth and development in both developed and underdeveloped countries (Familoni, 2006). Hall and Jones (1999) reported that higher economic growth and better quality of life can be achieved by development of social infrastructure like education, health, and housing which helps in efficient use of physical infrastructure and human resources. A similar study based on China revealed that infrastructure stock, labour force, public and private investment plays an important role in economic growth in China. Moreover, infrastructure development has significant positive contribution to growth than both private and public investment. The study has also found that there is one-way causality from infrastructure development to output growth which justifies China's heavy investment on infrastructure development (Sahoo et al, 2012).

From the available literature, it is found that most of the studies are associated with economic infrastructure and its importance for economic growth of a country. Also, most of these studies are conducted using country level data to show the role of infrastructure development on economic growth. However, there are few studies which are using state level data to unveil the contribution of social infrastructure not only towards economic growth but also in terms of other social indicators.

3. Objectives

Based on the research gap identified in the previous section following objectives are framed for the study:

- To study the variation in human development across the different states in India.
- To assess the effect of social infrastructure on human development across different states of India.

4. Variables And Data Sources

To assess the effect of social infrastructure on human development across different states in India, we have incorporated three variables, namely, governance, health infrastructure and Education infrastructure. The rationale behind using these variables are: fair and effective governance is critical for ensuring that development benefits all the peoples and also the country as a whole. Apart, health and education infrastructure is essential for developing human capabilities which have prime importance in economic development of a country. Enhancement in human capabilities is not only expands society's productive capacity but also contribute to the improvement in quality of life.

HDI values for different states have been taken from the Sub-national Human Development Database. Data on Crime rate for the 2016 has been collected from the handbook "crime in India 2016" published by National Crime Records Bureau (NCRB). Data on health and education infrastructure has been taken from Central Bureau of Health Intelligence (CBHI) from its annual publication 'National Health Profile 2017' and 'Statistical Year Book India 2017' by Ministry of Statistics and Programme Implementation, Government of India.

5. Model Specification And Estimation Procedure

In this study, human development has been denoted by the HDI values of the different states of India for the year 2016. For health infrastructure, data has been collected on number of hospital beds per thousand populations. Similarly, number of schools per thousand populations has been utilised to denote education infrastructure. However, crime rate, i.e., incidence of crime per thousand populations has been used as a proxy for governance. It is expected that the coefficient of all the independent variables, i.e., governance, health infrastructure and education infrastructure to have a positive sign, which would mean that higher values of the independent variables would lead to higher level of human development.

This study has adopted a Logit model for the estimation as the dependent variable, i.e., HDI values are bounded within the range 0 to 1. Because application of simple linear regression may give predicted values for the dependent variable which may not be confined to this range. The model can be as follows:

$$Y = \frac{1}{1 + e^{-z}}$$

Where, $Z = \beta_0 + \beta_1 GI + \beta_2 HI + \beta_3 EI + u$; and Y represents HDI values of the different states in 2016. LNGI implies values of the governance indicator; HI and EI represent the health infrastructure and education infrastructure indicators respectively.

Although, the initial model above is a non-linear one. But estimation can be done through linear regression utilizing Z as the regressand. Now, Z values can be constructed using following transformation formula (see appendix given below):

$$ln\left(\frac{Y}{1-Y}\right) = Z$$

From the above formula, we can say that Z is not bounded within the range 0 to 1. Z tends to -∞ when Y tends to 0. Similarly, when Y tends to 1, Z tends to ∞.

6. RESULTS AND DISCUSSION

Following table presenting the descriptive statistics shows the basic characteristics of the variables included in the study:

Table 1: Descriptive Statistics

Variable	Mean	S.D.	Maximum	Minimum	C.V. (%)
HDI	0.661	0.050	0.770	0.568	7.56
GI	0.457	0.253	1.253	0.051	55.36
HI	0.763	0.538	2.411	0.116	70.51
EI	5.585	2.815	14.497	2.063	50.40

NOTE: S.D. indicates Standard Deviation; C.V. indicates coefficient of variation (%)

Source: author's own calculation.

As we can see from the table 1 that relative to other variables, there is very much less variation in HDI values across states. This implies that almost all of the states are more or less at the same level of human development. However, all the independent variables are showing huge variations across states, which implies that there are significant differences among the states in India in governance, health infrastructure and education infrastructure. In Terms of human development, Kerala is most developed states in India. But in terms of governance, it is the lowest ranking state. Bihar is the least developed state in terms of human development, education infrastructure and health infrastructure.

Based on the above mentioned methodological procedure, regression results are presented in the following table:

Table 2: Regression Analysis

The results of regression analysis for explaining variations in human development index, 2016 across the Indian states				
Variable	Coefficient	Robust Std. error	t-Value	p-Value
Constant	0.682	0.089	7.62	0.000*
GI	− 0.212	0.139	− 1.52	0.141
HI	0.306	0.074	4.11	0.000*
EI	− 0.025	0.012	− 2.07	0.049**
$R^2 = 0.421$				
F-statistic = 6.18; p-value of F-statistic = 0.0027*				

Note: * and ** indicates statistically significant at 1% and 5% level respectively.

The result of the regression analysis (table 2) shows that the coefficient of health infrastructure and education infrastructure is statistically significant at 1% and 5% level, respectively. However, the coefficient of governance indicator is statistically insignificant. According to the results, HDI has a positive relation with health infrastructure but negative relation with education infrastructure. Apart, the overall model is statistically significant as F statistic of the model is significant at 1% level. This means, all the independent variables included in the model are collectively have significant impact on HDI values. The R-square value of the model is 0.421 which implies that governance, health and education infrastructure explains around 42% of the variation in HDI values across states. However, it can also be said that most of the variation in HDI values across states has taken place due to variations in level of social infrastructure.

7. Conclusion

This paper has attempted to study the effect of social infrastructure on human development in India. We have found that human development has positive association with health infrastructure but has negative association with education infrastructure in India. These results indicate that public investment on health infrastructure is

contributing towards its intended objectives. However, education infrastructure is not being able to achieve its intended objective. Therefore, we can conclude that having infrastructure only cannot lead us to higher human development levels. It is equally important to have operational efficiency, adequacy in numbers, their implementation and maintenance, and efficiency in utilization of the available infrastructure.

From policy perspective, the government of India should focus on developing new health infrastructure to improve in terms of human development. But, while developing education infrastructure the government should also need to be cautious about its efficient utilization.

References

1. Agenor, P.R. (2006) a theory of infrastructure-led development. Manchester: Centre for Growth and Business Cycle Research, Economic Studies, University of Manchester. pp. 213-230
2. Aschauer, D. A. (1990). Why is infrastructure. Industry Week, 21-50.
3. Goswami, B. and Bezbaruah, M.P. (2011) Social Sector Expenditures and Their Impact on Human Development: The Indian Experience. Indian Journal of Human Development, 5(2): 365-385.
4. Kessides, C. (1996) 'A Review of Infrastructure's Impact on Economic Development', in D. F. Batten et al. (eds.), Infrastructure and the Complexity of Economic Development. Berlin: Springer-Verlag
5. Familoni, K. A. (2006). The role of economic and social infrastructure in economic development: A global view. Journal of Economic Perspectives, 6(4), 11-32.
6. Global Datalab (2018) Subnational Human Development Index (4.0)
7. [Online]Available:https://globaldatalab.org/shdi/shdi/IND/?interpolation=0&extrapolation=0&nearest_real=0 [accessed 12nd January 2020]
8. Hall, R.E. and Jones, C.I. 1999, 'Why Do some Countries Produce so Much More Output Per Worker Than Others', Quarterly Journal of Economics, vol. 114, pp. 83–116.
9. Jacoby, S., Smith, J., Ting, L., & Williamson, I. (2002). Developing a common spatial data infrastructure between State and Local Government--an Australian case study. International Journal of Geographical Information Science, 16(4), 305-322.
10. Kusharjanto, H., & Kim, D. (2011). Infrastructure and human development: the case of Java, Indonesia. Journal of the Asia Pacific Economy, 16(1), 111-124.
11. Sahoo, P. & Dash, R.K. (2012) 'Economic growth in South Asia: Role of infrastructure', The Journal of International Trade & Economic Development: An International and Comparative Review, 21(2): 217-252
12. Sahoo, P.; Dash, R.K. & Nataraj, G. (2012) 'China's growth story: the role of physical and social infrastructure', Journal Of Economic Development,37(1): 53-75
13. World Bank. (1994). World Development Report 1994: Infrastructure for Development: Executive Summary. World Bank.

Appendix

Modification of the regression model:

$$Y = \frac{1}{1 + e^{-z}}$$

Or,

$$Y = \frac{e^{z}}{1 + e^{z}}$$

Or,

$\frac{Y}{1-Y} = e^{z}$

Or, $$ln\left(\frac{Y}{1-Y}\right) = Z$$

Or, $$ln\left(\frac{Y}{1-Y}\right) = \beta_0 + \beta_1 LNGI + \beta_2 LNHI + \beta_3 LNEI + u$$